

LETTER TO THE EDITOR

Response to Dr. Tschammler's Letter

Dear Sir,

Dr. Tschammler's letter raises several important points that should be considered carefully by anyone assessing the efficacy of preoperative investigative modalities. We corrected our data, based on the same definitions of accuracy, sensitivity, and specificity as indicated by Dr. Tschammler, and described these in fractions. Description of only percentages of accuracy, sensitivity, and specificity in our article (J Surg Oncol 1996;61:214–217) misleads readers, because the numbers of examined patients are different among the four investigative modalities.

Of 74 patients studied, 71 patients underwent routine ultrasonography (US) on the neck and 70 underwent US on the abdomen, preoperatively. Seventy patients underwent computed tomography (CT) on the neck and thorax, whereas 69 underwent CT on the abdomen. Sixty-one patients underwent endoscopic ultrasonography (EUS), but approximately 40% of these did not undergo a complete EUS because of an impassable esophageal disease. Only 28 patients underwent magnetic resonance imaging (MRI) on the neck and thorax, as this investigation was available only after 1989. Even after 1989, MRI of the abdomen was not performed routinely in our hospital. Therefore, in the corrected Tables I, II, and III here, the accuracy, sensitivity, and specificity are described by the ratios of the actual numbers of patients with positivity in each lymph node group for patients examined by each investigative modality. The statistical differences are examined by comparing the ratio of accuracy, sensitivity, and specificity of each investigative modality to the ratios of those of other investigative modalities.

The radiological and ultrasonographic criteria for assessment of the nodal status for each investigative modality are described in our published article in the *Journal of Surgical Oncology*. The criteria for US were the same as for EUS, and the criteria for MRI were basically similar to those for CT.

Data on accuracy, sensitivity, and specificity are influenced by the prevalence of pathological findings as kindly pointed out by Dr. Tschammler. The number of patients with positive metastasis in the lymph nodes was 56 (76%) of 74 patients studied here, whereas the numbers of patients with positive metastasis in the cervical,

thoracic, and abdominal lymph nodes were 16 (22%), 41 (55%), and 32 (43%), respectively. The numbers of patients with positive metastasis in each lymph node group were 9 (12%) for the cervical paraesophageal nodes, 13 (18%) for the supraclavicular nodes, 1 (1%) for the internal jugular nodes, 23 (31%) for the right recurrent nerve nodes, 7 (9%) for the left paratracheal nodes, 6 (8%) for the upper paraesophageal nodes, 3 (4%) for the infra-aortic arch nodes, 9 (12%) for the infracarinal nodes, 9 (12%) for the midparaesophageal nodes, 6 (8%) for the lower posterior mediastinal nodes, 6 (8%) for the lower paraesophageal nodes, 22 (30%) for the paracardiac nodes, 15 (20%) for the lesser curvature nodes, 8 (11%) for the left gastric nodes, and 1 (1%) for the coeliac nodes. Thus in Tables I, II, and III, the rates of sensitivity are described as the ratio of the true positive cases for cases having pathologically positive metastasis in each lymph node group and examined by each investigative modality, noting that the 74 patients did not undergo all of CT, MRI, EUS, and US, in this study.

The overall accuracy was 60% (44/73) for CT, 61% (17/28) for MRI, 61% (37/61) for EUS, and 51% (36/71) for US, with no significant difference among the four investigative modalities. The accuracy, sensitivity, and specificity of each investigative modality for the cervical, thoracic, and abdominal nodes are described in Table I. CT showed a higher sensitivity and a lower specificity for the abdominal nodes than the other investigative modalities, whereas the US showed a higher sensitivity and a lower specificity for the cervical nodes. The accuracy, sensitivity, and specificity for each lymph node group are described in Tables II and III. The accuracy for each lymph node group was not much different among the four investigative modalities. However, CT showed a higher or a relatively higher sensitivity for the right recurrent nerve nodes and the abdominal nodes, including the paracardiac, lesser curvature, and left gastric nodes. EUS showed a higher or a relatively higher sensitivity for the upper and midparaesophageal nodes. US showed a relatively higher sensitivity for the cervical nodes includ-

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TABLE I. Efficacy of Each Investigative Modality in Preoperative Assessment of Nodal Metastasis in Esophageal Cancer†

Lymph nodes	CT ^a			MRI ^b			EUS ^c			US ^d		
	A ^e	Se ^f	Sp ^g	A ^e	Se ^f	Sp ^g	A ^e	Se ^f	Sp ^g	A ^e	Se ^f	Sp ^g
Cervical	57/70 (81)	4/14 (29)	53/56 (95)	23/28 (82)	2/7 (29)	21/21 (100)	48/61 (79)	1/14 (7)	47/47 (100)	54/71 (76)	10/14* (71)	44/57** (77)
Thoracic	47/70 (67)	20/38 (53)	27/32* (84)	19/28 (68)	10/14 (71)	9/14 (64)	33/61 (54)	19/33 (58)	14/28 (50)	—	—	—
Abdominal	44/69 (64)	10/30* (33)	34/39** (87)	—	—	—	36/61 (59)	1/26 (4)	35/35 (100)	39/70 (56)	0/30 (0)	39/40 (98)

†Percentages in parentheses.

^aComputed tomography.^bMagnetic resonance imaging.^cEndoscopic ultrasonography.^dUltrasonography.^eAccuracy.^fSensitivity.^gSpecificity.*Significantly higher than the other investigative modalities ($P < 0.05$).**Significantly lower than the other investigative modalities ($P < 0.05$).**TABLE II. Efficacy of Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) in Preoperative Assessment of Nodal Metastasis in Esophageal Cancer†**

Lymph node group	CT			MRI		
	A ^a	Se ^b	Sp ^c	A ^a	Se ^b	Sp ^c
Cervical paraesophageal	58/70 (83)	1/9 (11)	57/61 (93)	24/28 (86)	1/4 (25)	23/24 (96)
Supraclavicular	61/70 (87)	2/11 (18)	59/59 (100)	22/28 (79)	0/6 (0)	22/22 (100)
Right recurrent nerve	55/70 (79)	8/21 (38)*	47/49 (96)	22/28 (79)	2/7 (29)	20/21 (95)
Left paratracheal	63/70 (90)	3/7 (43)	60/63 (95)	23/28 (82)	2/2 (100)	21/26 (81)
Upper paraesophageal	63/70 (90)	0/6 (0)	63/64 (98)	25/28 (89)	0/0	25/28 (89)
Infra-aortic arch	66/70 (94)	1/3 (33)	65/67 (97)	24/28 (86)	0/2 (0)	24/26 (92)
Infracarinal	59/70 (84)	2/8 (25)	57/62 (92)	23/28 (82)	1/1 (100)	22/27 (81)
Midparaesophageal	58/70 (83)*	1/8 (13)	57/62 (92)*	18/28 (64)	0/1 (0)	18/27 (67)
Lower posterior mediastinal	65/70 (93)	0/4 (0)	65/66 (98)	26/28 (93)	0/2 (0)	26/26 (100)
Lower paraesophageal	64/70 (91)*	0/4 (0)	64/66 (97)*	19/28 (68)	0/4 (0)	19/24 (79)
Paracardiac	49/69 (71)	4/20 (20)	45/49 (92)	—	—	—
Lesser curvature	55/69 (80)	3/12 (25)*	52/57 (91)**	—	—	—
Left gastric	60/69 (87)	2/7 (29)	58/62 (94)**	—	—	—

†Percentages in parentheses.

^aAccuracy.^bSensitivity.^cSpecificity.*Significantly higher than the other investigative modalities ($P < 0.05$).**Significantly lower than the other investigative modalities ($P < 0.05$).

ing the cervical paraesophageal and supraclavicular nodes. These results indicated that each investigative modality has its strong point to detect metastasis-positive nodes: US for the cervical nodes, EUS for the paraesophageal nodes, and CT for the paratracheal and abdominal nodes.

Surgeons tend to employ the more sensitive criteria and investigative modality for assessment of the nodal status, even if the specificity is low to some extent. In contrast, radiologists have a tendency to consider that the overall accuracy is more important than sensitivity. The sensitivity of EUS in our study was inferior to that re-

ported in the literature, although that of CT and of MRI were similar to those reported elsewhere [1,2]. We consider that the inconsistencies were due to our study being a prospective trial based on reports from radiologists, due to the low prevalence of pathologically metastasis-positive nodes in each lymph node group, because the lymph nodes resected were systemically divided into many groups [3], and due to the high incidence of metastasis in the small lymph nodes in our study. Kawahara et al. [4] has previously reported that in esophageal cancer treated in our department, 38% of the metastasis-positive nodes were <0.5 cm in diameter. Moreover, the

TABLE III. Efficacy of Endoscopic Ultrasonography (EUS) and Ultrasonography (US) in Preoperative Assessment of Nodal Metastasis in Esophageal Cancer†

Lymph node group	EUS			US		
	A ^a	Se ^b	Sp ^c	A ^a	Se ^b	Sp ^c
Cervical paraesophageal	55/61 (90)	1/7 (14)	54/54 (100)	59/71 (83)	5/9 (56)	54/62 (87)**
Spraclavicular	50/61 (82)	0/11 (0)	50/50 (100)	53/71 (75)	4/12 (33)	49/59 (83)**
Right recurrent nerve	39/61 (64)	2/22 (9)	37/39 (95)	—	—	—
Left paratracheal	50/61 (82)	2/5 (40)	48/56 (86)	—	—	—
Upper paraesophageal	56/61 (92)	3/4 (75)*	53/57 (93)	—	—	—
Infra-aortic arch	60/61 (98)	0/1 (0)	60/60 (100)	—	—	—
Infracarinal	51/61 (84)	1/6 (17)	50/55 (91)	—	—	—
Midparaesophageal	37/61 (61)	4/7 (57)	33/54 (61)	—	—	—
Lower posterior mediastinal	55/61 (90)	0/5 (0)	55/56 (98)	—	—	—
Lower paraesophageal	47/61 (77)	0/4 (0)	47/57 (82)	—	—	—
Paracardiac	46/61 (75)	1/16 (6)	45/45 (100)	49/70 (70)	0/20 (0)	49/50 (98)
Lesser curvature	50/61 (82)	0/11 (0)	50/50 (100)	56/70 (80)	0/14 (0)	56/56 (100)
Left gastric	54/61 (89)	0/7 (0)	54/54 (100)	62/70 (89)	0/8 (0)	62/62 (100)

†Percentages in parentheses.

^aAccuracy.^bSensitivity.^cSpecificity.*Significantly higher than the other investigative modalities ($P < 0.05$).**Significantly lower than the other investigative modalities ($P < 0.05$).

cervical and upper mediastinal nodes, including the cervical paratracheal nodes, the right recurrent nerve nodes, and the left paratracheal nodes, were examined in our present study. These nodes were difficult to detect using EUS, because EUS for the cervical and upper thoracic esophagus was associated with pain to our patients and also with technical difficulties involving the air in the trachea. We do not agree with the opinion expressed by Tio et al. [5] that EUS was more accurate than CT in the assessment of lymph nodes metastasis. We consider that CT and MRI are useful to assess the whole situation of lymph node metastasis systemically, whereas EUS and US are useful to assess the local situation of lymph node metastasis in the region of the esophagus. The best use should be made of all four modalities, i.e., CT, MRI, EUS, and US for the preoperative staging of the N-classification.

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